20181019c MT105A 05 Partial derivatives

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### First and second order partial derivatives

Actually very simple  
Just treat the other var as constant

library(Ryacas)  
library(mosaic)

#### Let Z = x^2 \* y + y^3 \* x

y = Sym('y')  
x = Sym('x')  
Z = x^2 \* y + y^3 \* x  
Zx = deriv(Z,x); Zx

## expression(2 \* (x \* y) + y^3)

Zy = deriv(Z,y); Zy

## expression(x^2 + 3 \* (y^2 \* x))

Zxx = deriv(Zx,x); Zxx

## expression(2 \* y)

Zxy = deriv(Zx,y); Zxy

## expression(2 \* x + 3 \* y^2)

Zyx = deriv(Zy,x); Zyx

## expression(2 \* x + 3 \* y^2)

Zyy = deriv(Zy,y); Zyy

## expression(6 \* (y \* x))

### Graphing functions of two variables

library(manipulate)  
# Required for plotting surface = T

plotFun(x^2 \* y + y^3 \* x ~ x & y, surface = T)

